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The base electrode and the collector electrode of the transistor Q2 are connected with a base electrode and a collector electrode of a transistor Q3. Thus, the transistor Q3 is also of the diode-connected configuration, and is connected in parallel with the diode-connected transistor Q2 with a polarity opposite from the transistor Q2. A current source 112 is connected between the power supply line 103 and a common connection point of the bases and the collectors of the transistors Q2 and Q3. An emitter electrode of the transistor Q3 is connected with an emitter electrode of a transistor Q4. A current source 113 is connected between the GND line 104 and a common emitter connection point of the transistors Q3 and Q4.

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FIG. 3 shows characteristics of the current I_O with respect to the input v_i . In the characteristic diagram of FIG. 3, a curve indicated by alternate long and short dashed lines plotted by a mark of O represents a characteristic of the conventional circuit of FIG. 13 when $n = 4$; a curve indicated by a broken line plotted by a mark of O represents a characteristic of the conventional circuit of FIG. 14 when $n = 3$; and a curve indicated by a solid line plotted by a mark of \times represents a characteristic of the circuit according to the first embodiment. As is clear from the characteristic diagram, linearity of the current I_O of the circuit according to the first embodiment is better than that of the circuits according to the conventional examples.

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FIG. 4 shows input-output characteristics when an

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cont.

input frequency f is $f = f_c$. FIG. 5 shows distortion factor (T. H. D.) characteristics when $f = f_c$. Also in these characteristic diagrams, a curve indicated by alternate long and short dashed lines plotted by a mark of O represents a characteristic of the conventional circuit of FIG. 13 when $n = 4$; a curve indicated by a broken line plotted by a mark of O represents a characteristic of the conventional circuit of FIG. 14 when $n = 3$; and a curve indicated by a solid line plotted by a mark of \times represents a characteristic of the circuit according to the first embodiment. As is clear from the characteristic diagram of FIG. 4, linearity of the input-output characteristic of the circuit according to the first embodiment is better than that of the circuits according to the conventional examples. As is clear from the characteristic diagram of FIG. 5, the circuit according to the first embodiment has a distortion factor better than those of the circuits according to the conventional examples within a range of 0.9% or less.

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On the other hand, a second differential circuit 36A is formed by four transistors Q36 to Q39 connected in parallel with each other and a diode-connected transistor Q40 having an emitter electrode connected to each of emitter electrodes of the transistors Q36 to Q39. A current source 42A is connected between a common emitter connection point of the transistors Q36 to Q40 and the GND line 34.

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On the other hand, a second differential circuit 56A is formed by four transistors Q56 to Q59 connected in parallel with each other and each having a base electrode connected to